

LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES



**OFFICE OF FISHERIES
INLAND FISHERIES SECTION**

PART VI -B

WATERBODY MANAGEMENT PLAN SERIES

CROSS LAKE

**WATERBODY EVALUATION &
RECOMMENDATIONS**

CHRONOLOGY

DOCUMENT SCHEDULED TO BE UPDATED EVERY THREE YEARS

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WATERBODY EVALUATION

STRATEGY STATEMENT

Recreational

Largemouth bass (*Micropterus salmoides*) are managed to provide the opportunity to catch fish of greater than average size and anglers are afforded the opportunity to catch an occasional memorable or trophy-size fish through the introduction of Florida largemouth bass. Sunfish, catfish and crappie are managed to provide a sustainable population while providing anglers the opportunity to catch or harvest numbers of fish adequate to maintain angler interest and efforts.

Commercial

Catfish are managed to provide a sustainable population while providing anglers and commercial fishers the opportunity to harvest numbers of fish. Commercial fishing is only allowed by contract with the City of Shreveport as per a city ordinance (see City Regulations below).

Species of Special Concern

No threatened or endangered fish species are found in this waterbody. Bald Eagles (*Haliaeetus leucocephalus*) are frequently seen around the lake during the winter.

EXISTING HARVEST REGULATIONS

Recreational

Cross Lake has a 14 – 17 inch protective slot limit for black bass, along with an 8 fish daily creel limit of which only 4 fish may be over 17 inches long. Statewide regulations apply for all other fish species. The recreational fishing regulations may be viewed at the following link: <http://www.wlf.louisiana.gov/fishing/regulations>

Note: A Notice of Intent (NOI) was passed by the Louisiana Wildlife and Fisheries Commission on January 9, 2014 to remove the 14” - 17” protective slot limit on Cross Lake and replace it with the statewide creel limit of 10 fish per day for black bass. There will be a 45 day period of public comment. If no major opposition is voiced, the regulation change will be effective April 20, 2014.

Commercial

The use of gill nets, trammels nets, hoop nets and fish seines was prohibited in Cross Lake in September 1986 by the Louisiana Wildlife and Fisheries Commission. Commercial fishing is allowed only by contract with the City of Shreveport per city ordinance (see City Regulations below for more details). The statewide commercial fishing regulations may be viewed at the link below:

<http://www.wlf.louisiana.gov/fishing/regulations>

City Regulations

Cross Lake is owned, operated and maintained by the City of Shreveport as a water supply reservoir for the city.

Act No. 31 of the 1910 Louisiana Legislature (Appendix I) transferred Cross Lake to the City of Shreveport as a water supply for the city and gave the city the authority to enact and enforce rules and regulations pertaining to Cross Lake.

In addition to the prohibition of gill nets, trammels nets, hoop nets and fish seines by the Louisiana Wildlife and Fisheries Commission, the City of Shreveport has ordinances regulating commercial fishing activities on the lake. Section 78-403 of the Code of Ordinances prohibits the taking of fish, turtles or other wildlife from Cross Lake or by the use of nets of any kind, traps, wire baskets, yoyos, set lines, or trotlines. Section 78-404 allows commercial fishing on Cross Lake pursuant to a contract with the City of Shreveport, and allows such contract to provide for exemptions to Section 78-403.

The City of Shreveport passed a resolution on September 24, 2013 authorizing the Mayor to enter into an agreement with two interested parties to conduct turtle trapping operations on Cross Lake.

Boat permits are required and may be obtained from the Cross Lake Patrol Office. The Cross Lake Patrol is responsible for enforcing city ordinance pertaining to Cross Lake. Rules and regulations pertaining to Cross Lake can be viewed at:

<http://crosslakeshreveport.com/cross-lake-rules-and-regulations-shreveport/>

Shreveport Police Department – Cross Lake Patrol
2900 Municipal Pier Rd.
Shreveport, LA 71119
318-673-7245

The Code of Ordinances concerning Cross Lake for the City of Shreveport may be viewed at the link below:

http://library.municode.com/print.aspx?h=&clientID=10151&HTMRequest=http%3a%2f%2flibrary.municode.com%2fHTML%2f10151%2flevel3%2fPTIICOOR_CH78STSIOTPUPL_ARTVIIIICRLA.html

SPECIES EVALUATION

Recreational

Cross Lake has been sampled with various types of gear over the years. Biomass (rotenone) sampling was one of the primary sampling methods utilized from 1967 through 1989 in an effort to estimate standing crop of all fish in the lake. Biomass sampling was discontinued in 1990. Electrofishing samples were initiated in 1988 to collect information specifically on largemouth bass and crappie (*Pomoxis spp.*) populations. Largemouth bass and crappie are targeted as species indicative of the overall health of fish populations due to their high position in the food chain. Forage samples are conducted in conjunction with fall electrofishing samples. Gill net sampling was initiated in 1978 to sample the hybrid striped bass population and commercial species of fish (e.g., catfish, common carp, and freshwater drum).

Largemouth bass

Biomass estimates-

Electrofishing is the best indicator of largemouth bass abundance and size distribution, with the exception of large fish (i.e., > 5 lbs.). Sampling with gill nets provides better assessment of large bass and other large-bodied fish species (e.g., bowfin or common carp). Biomass (rotenone) sampling was the primary method used to sample the fisheries in Cross Lake until 1988. Figure 1 indicates the standing crop estimates of largemouth bass in pounds per acre from 1967 up until 1989. There was no significant change in the standing crop of largemouth bass on Cross Lake during the period sampled except for the 1986 sample when nearly 25 pounds of largemouth bass per acre was the average for 3 one acre rotenone samples. The yearly average standing crop for all other years sampled ranged from 1.7 to 7.6 pounds per acre. These estimates are quite possibly low as the typical sites selected on Cross Lake for rotenone sampling were not in ideal bass habitat. During the 1986 sampling, one site was selected in shallow, cypress tree-filled flat and yielded in excess of 70 pounds of bass. This lone sample accounts for the variance in the 1986 sampling as seen below, but may be more indicative of the standing crop of largemouth bass in suitable habitat on Cross Lake.

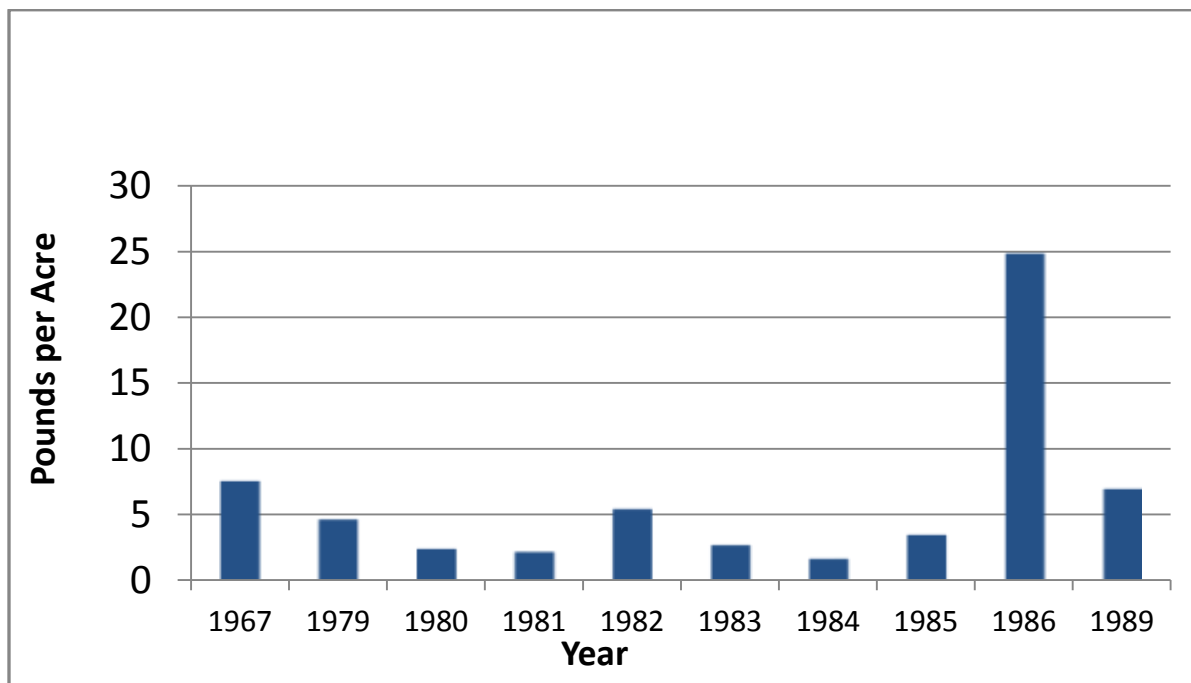


Figure 1. Annual estimates in pounds per acre of largemouth bass collected during biomass (rotenone) sampling in Cross Lake, LA from 1967 to 1989.

Catch per unit effort and size distribution-

Electrofishing has been the primary sampling technique utilized on Cross Lake in recent years. Results from spring electrofishing samples for stock-size (i.e., total length ≥ 8 in.) largemouth bass from 1990 – 2012 are presented in Figure 2. The trend line from data collected during this time period indicates a slight increase in stock-size fish in Cross Lake over this time period.

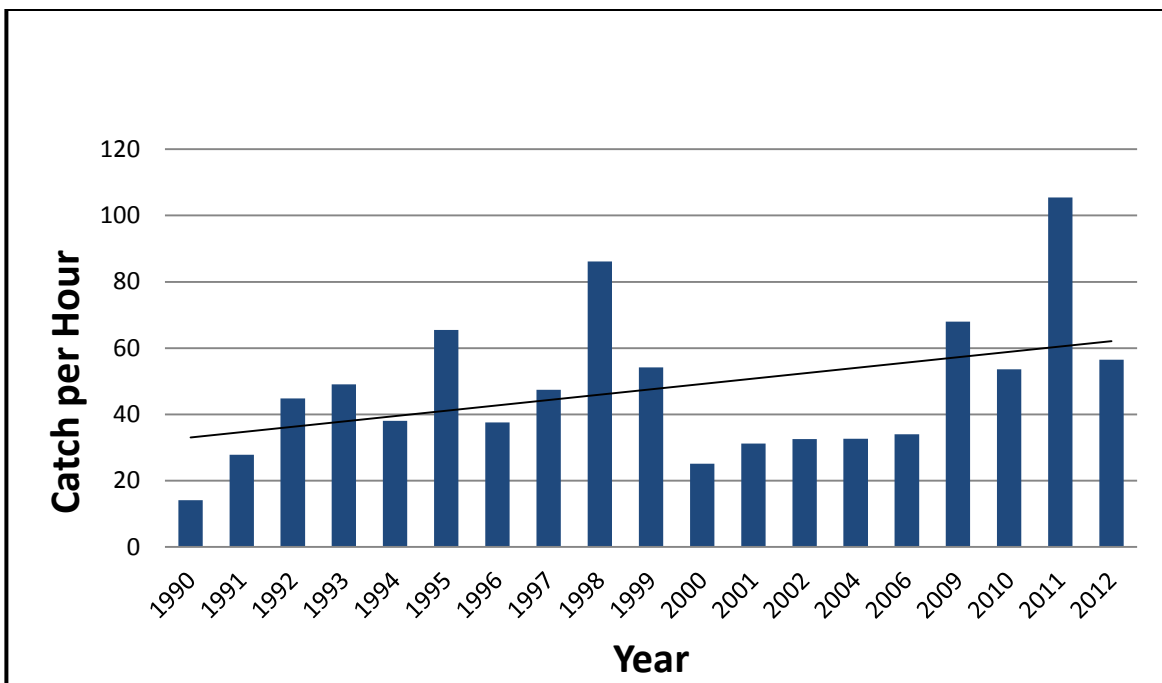


Figure 2. The catch-per-unit-of-effort (CPUE) for stock-size (8'' and larger) largemouth bass from spring electrofishing results on Cross Lake, LA from 1990-2012.

The CPUE for stock-size largemouth bass from the fall electrofishing samples are shown in Figure 3. Results from both the spring and fall electrofishing samples for stock-size largemouth bass suggest a similar trend over the time period sampled.

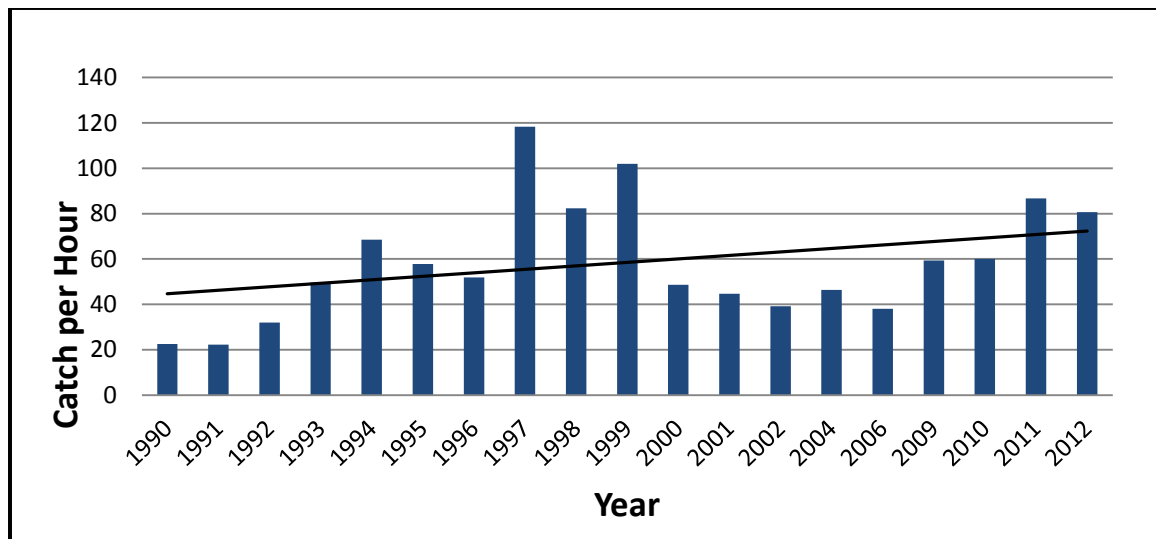


Figure 3. The catch-per-unit-of-effort (CPUE) for stock-size (8'' and larger) largemouth bass collected from fall electrofishing results on Cross Lake, LA from 1990-2012.

Proportional stock density (PSD) and relative stock density (RSD) are indices used to numerically describe length-distribution data. Proportional stock density compares the number of fish of quality-size (greater than 12 inches for largemouth bass) to the number of bass of stock-size [greater than 8 inches in total length (TL)]. The PSD is expressed as a percentage. A fish population with a high PSD consists mainly of larger individuals, whereas a population with a low PSD consists mainly of smaller fish. Relative stock density compares the number of fish of a given size range to the number of bass of stock size. A

common calculation used in fisheries management is for RSD-Preferred (RSD-P). This value compares the number of largemouth bass > 15 inches TL to the number of stock-size largemouth bass in the population. This is also commonly called RSD-15 values. Values for PSD and RSD – Preferred (> 15 inches in TL) from the spring electrofishing samples are shown in Figure 4. Ideal PSD and RSD-P values for largemouth bass range from 40-70 and 10-40, respectively. Spring electrofishing samples from recent years indicate that the Cross Lake largemouth bass population is near the upper end of the preferred range for both statistics, thus showing that Cross Lake maintains an abundance of bass greater than 15 inches (Figure 4). Trend lines suggest a slight increase in PSD and RSD-P values for largemouth bass in Cross Lake over the period 1990 to 2012.

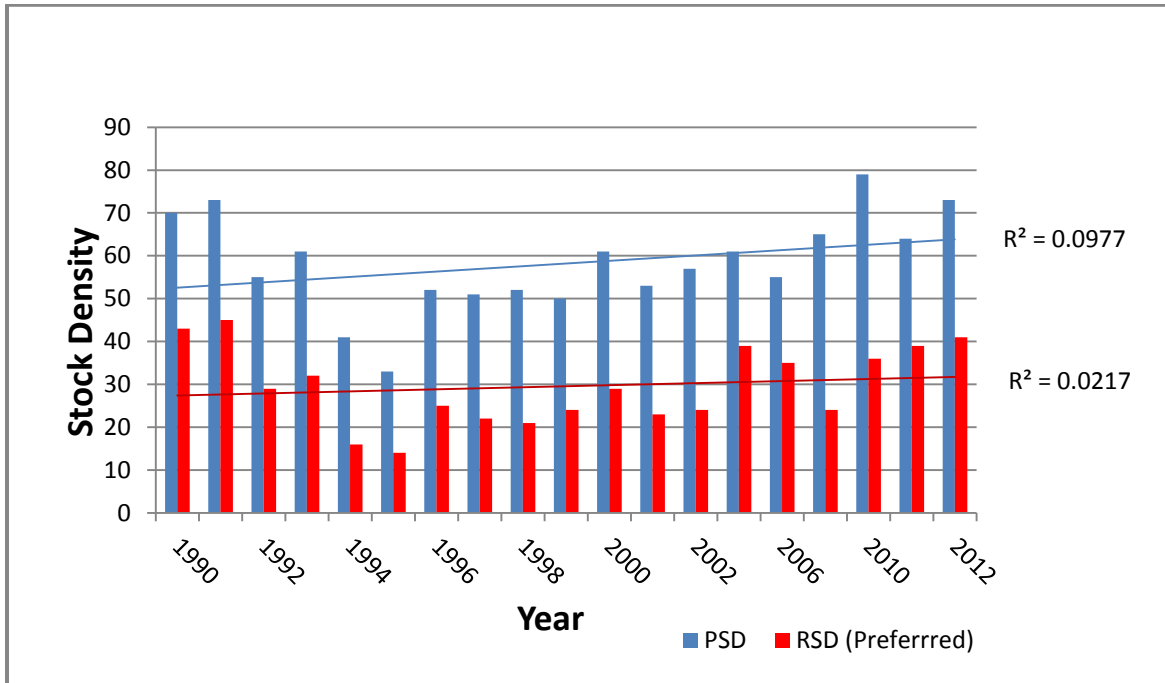


Figure 4. The size-structure indices for largemouth bass on Cross Lake, LA, from 1990 to 2012 for spring electrofishing results. R^2 values are for the trend lines shown.

Largemouth bass size-structure indices for fish collected during the fall electrofishing samples indicate results similar to those found in the spring samples with variation from year to year. No significant change was observed in the proportion of preferred-size fish during this time period. The graph shows a slight decline in the proportion of quality-size fish over the entire period, but essentially no change within the last fifteen years. This information is shown in Figure 5 below.

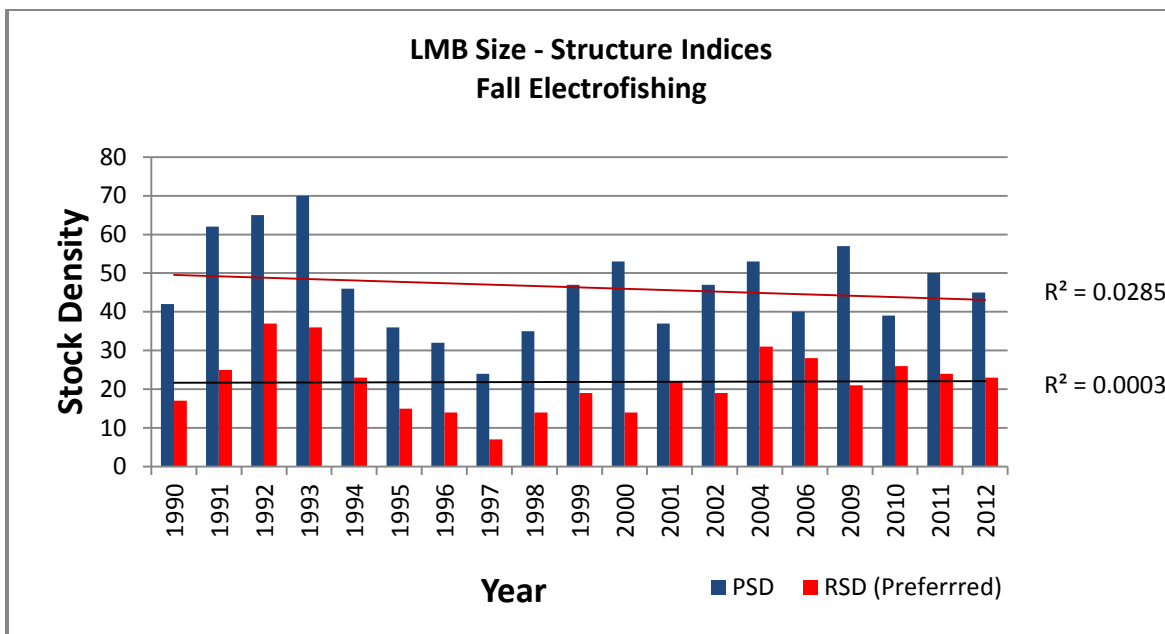


Figure 5. The size-structure indices for largemouth bass collected on Cross Lake, LA during fall electrofishing from 1990 to 2012.

Gill net sampling conducted on Cross Lake provides insight into fish that are not effectively sampled with standardized electrofishing techniques. Those include larger size largemouth bass, hybrid striped bass and crappie. Figure 6 indicates the number per net night and size distribution of largemouth bass captured in standardized sampling gill nets from 2003 – 2013. Largemouth bass were not prevalent during these gill net samples and the results are not indicative of the overall population as the gill nets were fished in open water areas of the lake.

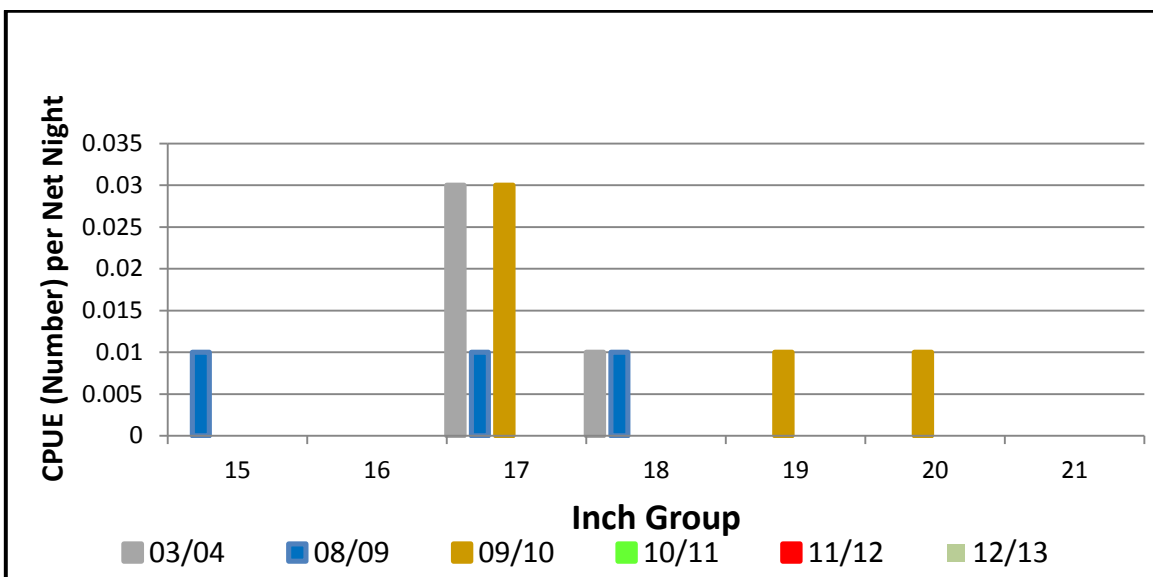


Figure 6. The CPUE (number) per net night (100' net) of largemouth bass collected on Cross Lake, LA, from standardized gill net results from 2003 - 2013.

Floating gill nets were fished in early March 2011 and mid-February 2012 in order to sample the larger size bass which did not show up in standard gill nets fished in the open water areas of the lake. These nets consisted of standard monofilament gill nets with the lead line and tie downs removed. The nets were fished in the littoral zone of the lake close to cover in order to target larger size classes of largemouth bass for inclusion in the mortality study. The nets were fished two nights during 2011. Each night the following net sizes were fished: 200 yards of 3" bar mesh, 300 yards of 3.5" bar mesh, and 100 yards of 4" bar mesh. The floating nets were fished one night during 2012. During this sample, 200 yards of 3" bar mesh, 400 yards of 3.5" bar mesh, and 200 yards of 4" bar mesh nets were fished. The CPUE of largemouth bass was substantially increased versus the catch of standard gill net sampling. The results are presented in Figure 7.

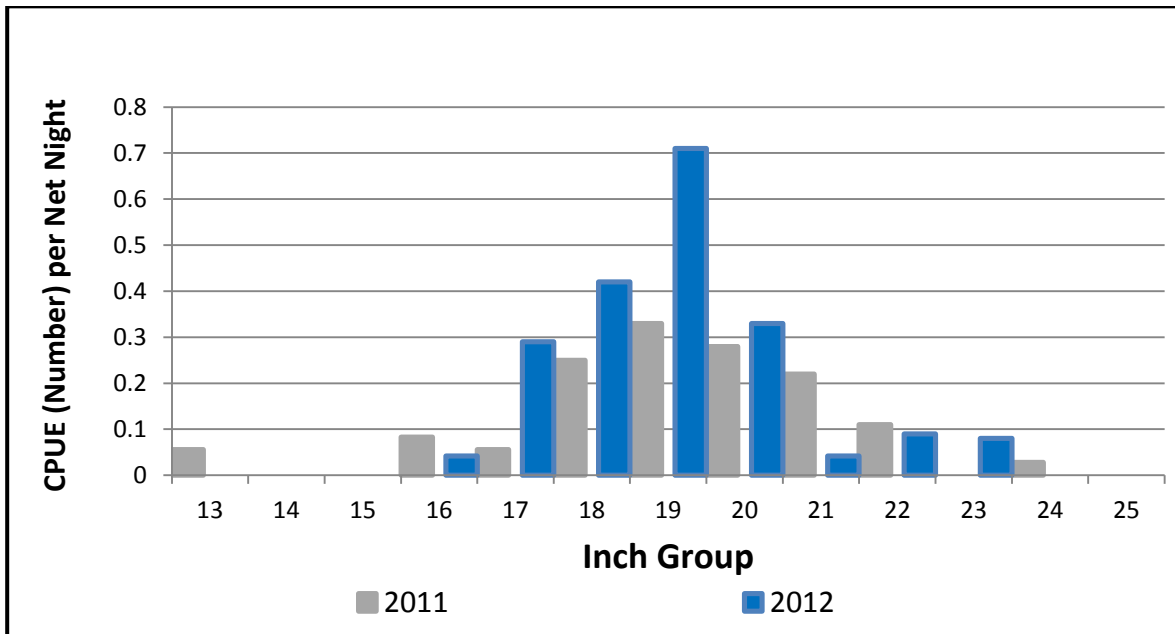


Figure 7. The CPUE (number) per net night (100' net) of largemouth bass collected utilizing floating gill nets on Cross Lake, LA in 2011 and 2012.

Age, growth, and mortality-

A study to describe the Cross Lake largemouth bass population was recently completed. The project included data collection over a three year period from 2010 – 2012. Population dynamics including relative abundance, spawning success, growth, body condition, mortality, and longevity were analyzed. Cross Lake anglers were also surveyed to collect insight regarding their collective influence on the largemouth bass population.

Electrofishing gear was used to collect largemouth bass from Cross Lake each spring. Length and weight measurements were recorded for each fish. Sagittal otoliths (ear bones) were removed from approximately 47% of the sampled fish for age and growth determination. Annual growth rings on the otoliths provide an accurate measurement of fish age. Size and age for all of the sample fish were combined to generate estimates of average growth rate and longevity. Angler surveys were conducted during the sample period to document fishing effort, angler catch rate and harvest rates.

As Figure 8 illustrates, Cross Lake supports a healthy bass population with some individuals

reaching 22 inches. Largemouth bass ranging from 10 to 18 inches were well represented in the 2nd and 3rd years of the project. It is important to note that spring sampling typically does not include fingerling size bass. However, the recurring presence of small (age-1) bass indicates consistently successful reproduction.

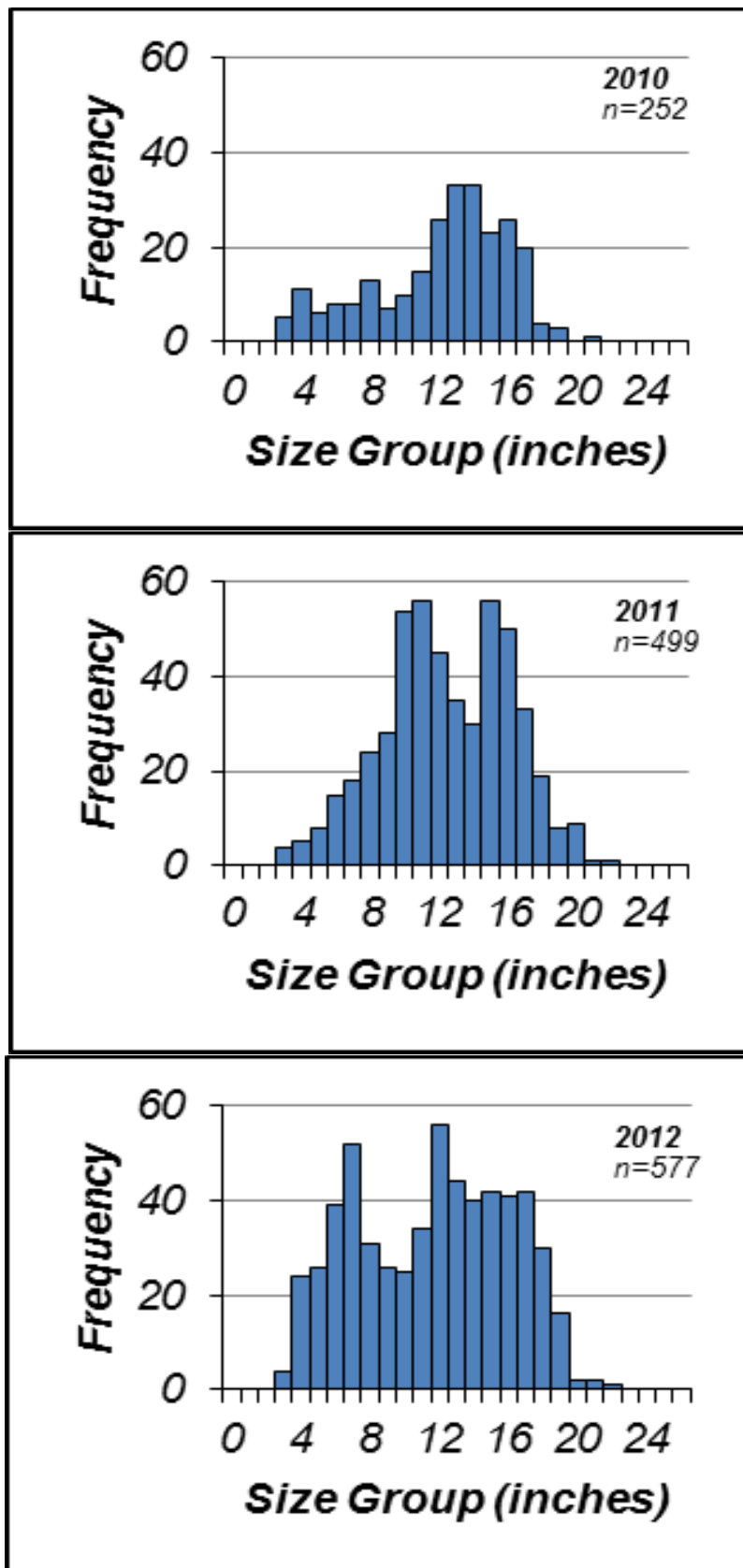


Figure 8. Annual length distributions of largemouth bass collected from Cross Lake, LA during spring electrofishing surveys in 2010 – 2012. Sample sizes (n) are shown on each yearly graph.

Age structure of the complete electrofishing sample (2010-2012) is shown in Figure 9. Forty percent of the total sample were comprised of age-1 and age-2 bass. The majority of the age 8+ fish were females. While bass up to 12 years old were found, only a small percentage of Cross Lake largemouth bass were 6 years and older.

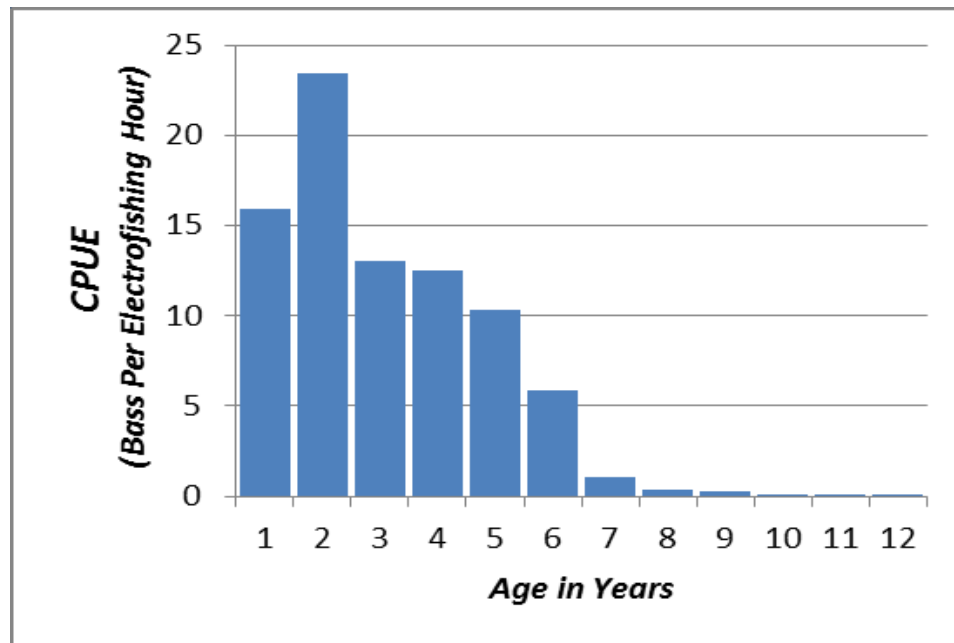


Figure 9. The catch per unit effort (CPUE) for largemouth bass by age class for Cross Lake, LA, from spring electrofishing results, 2010 – 2012. $n = 1328$.

Average length at age for Cross Lake bass is provided in Table 1. Growth is rapid through age-5, but then slows to only an inch or less per year.

Table 1. Length at age for largemouth bass from Cross Lake, LA, 2010 – 2012.

Age	Length in Inches
1.0	6.8
2.0	10.9
3.0	13.9
4.0	16.0
5.0	17.4
6.0	18.5
7.0	19.3
8.0	19.8
9.0	20.2
10.0	20.5
11.0	20.7
12.0	20.8

Body condition for Cross Lake bass can be described as very robust. Good physical

condition of bass generally is the product of an adequate food supply that is readily available to predation. Figure 10 shows the observed and predicted weight and total length from the 2010 – 2012 spring electrofishing samples.

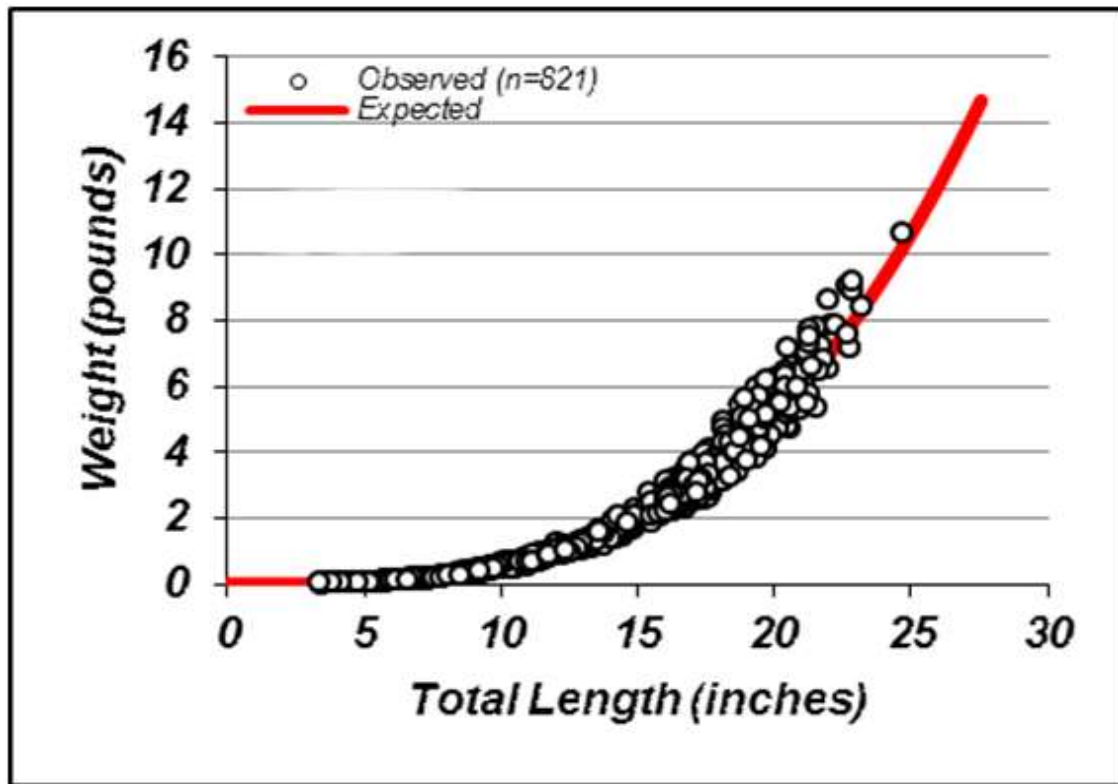


Figure 10. Observed and predicted weight at total length of Cross Lake, LA, largemouth bass collected from spring electrofishing results 2010 – 2012.

One of the more significant findings of the project was the stable recruitment of age-1 largemouth bass into the Cross Lake population. Contributing factors include favorable water fluctuation, abundant forage, quality spawning substrate, and adequate protective cover for fingerlings.

The rate at which fish die each year is referred to as mortality. Mortality consists of two parts: natural mortality (predation, disease) and fishing mortality (angler harvest and discard mortality). Results of the study indicate that the total mortality rate for Cross Lake bass is comparable to other recently sampled Louisiana lakes at 48% per year. The following example is provided to illustrate the effect. At 48% mortality, if you start with 100 age-1 Cross Lake bass, only 6 will remain alive by age 5.

Length distribution, age structure, growth rate, and mortality rate were found to be at levels that provide a stable bass population in Cross Lake. The results of this study suggest that the Cross Lake bass population has a total mortality that is similarly influenced by natural and fishing related mortalities (26 and 23%, respectively estimated). The fishing mortality rate for Cross Lake bass was estimated at 23% per year. This rate comes from two sources; 1) harvest and 2) post release mortality. Creel survey results indicate that almost half (47%) of the anglers utilizing Cross Lake describe themselves as bass anglers. The results also suggest that these same bass anglers voluntarily release a much larger percentage of largemouth bass than they harvest (92% of legal size fish are released). Bass Anglers caught an average of

0.995 bass/trip with an estimated 8,075 bass angling trips annually. This creel information would suggest that even the 23% angling mortality estimate from statistical analysis may be quite liberal.

The current black bass regulation was implemented to use angler harvest as a management tool to increase abundance of bass larger than 17". Angler harvest is critical for effectiveness of the regulation, but the results of this project indicate that Cross Lake largemouth bass harvest is lacking due to anglers' tendency to voluntarily release fish of legal harvest size. If Cross Lake anglers remain hesitant to harvest bass, the effectiveness of any size regulation as a management tool would be severely limited.

A Notice of Intent (NOI) was passed by the Louisiana Wildlife and Fisheries Commission on January 9, 2014 to remove the 14" - 17" protective slot limit on Cross Lake and replace it with the statewide creel limit of 10 fish per day for black bass. There will be a 45 day period of public comment. If no major opposition is voiced, the regulation change will be effective April 20, 2014.

Largemouth bass genetics

Florida largemouth bass stockings on Cross Lake were initiated in 1982 in an effort to offer anglers a chance to catch a fish of greater than average size. To date, 2,461,945 Florida bass fingerlings have been stocked in Cross Lake. Genetic analysis of the largemouth bass population in Cross Lake was conducted every three years from 1992 – 2004. Testing was conducted annually from 2010 – 2012 in conjunction with the largemouth bass study on Cross Lake. The results are listed in Table 2, the overall Florida genome increased from 3% to 27% during the study period; however, the percentage of pure Florida largemouth bass remained very low ranging from 0% to 4%. The latest genetic testing, conducted in 2012, indicated a 27% Florida bass genetic introgression, but only 3% are pure Florida bass.

Table 2. – Largemouth bass genetic analysis from Cross Lake, LA, 1992 - 2012.

Year	Number	Northern %	Florida %	Hybrid %
1992	33	97%	3%	0%
1995	44	93%	0%	7%
1998	60	81%	2%	17%
2001	50	76%	4%	20%
2004	70	86%	1%	13%
2010	145	82%	3%	15%
2011	281	79%	4%	17%
2012	307	73%	3%	24%

Forage

Forage availability is measured directly through fall forage electrofishing results and indirectly through measurement of largemouth bass body condition or relative weight (Wr). Relative weight is the ratio of a fish's weight to the weight of a "standard" fish of the same length. The Wr index is calculated by dividing the weight of a fish by the standard weight for its length, and multiplying the quotient by 100. Largemouth bass Wr below 80 indicate a potential problem with forage availability.

Figure 12 illustrates the relative weight (Wr) for stock-size and larger bass collected during fall electrofishing samples from 1990 – 2012. Relative weights were above 90 indicating that sufficient forage was available for these size groups of largemouth bass during this period.

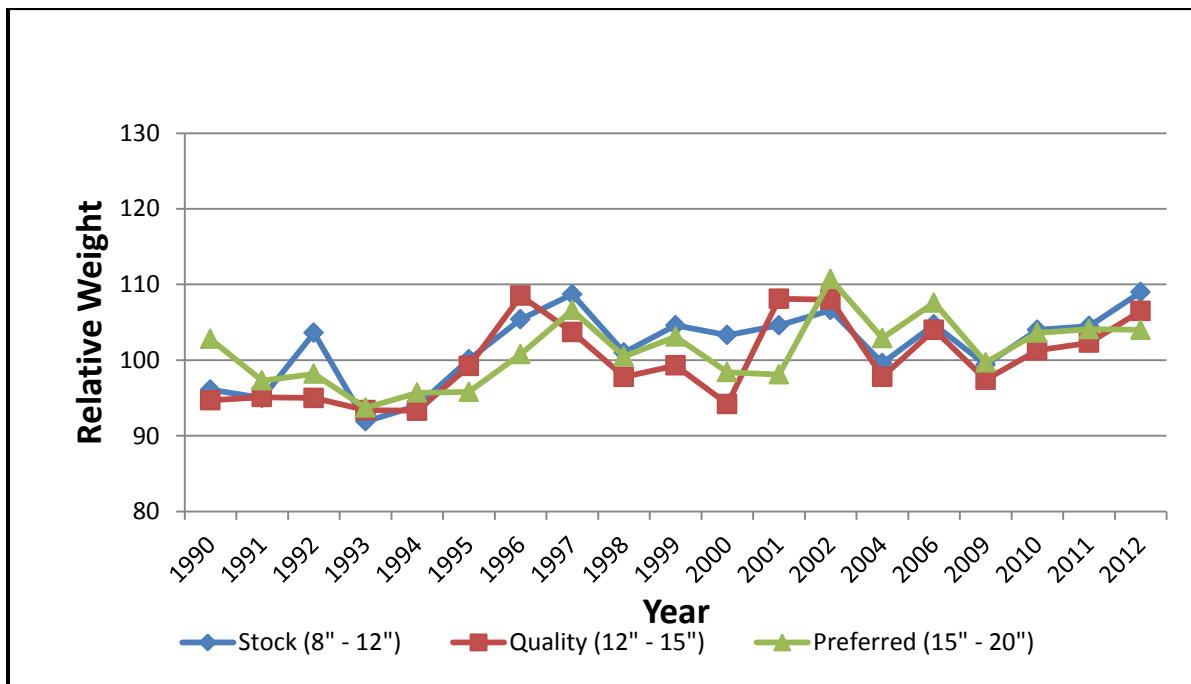


Figure 12. The relative weights of largemouth bass by size group collected during fall electrofishing from Cross Lake, LA from 1990 to 2012.

Forage samples were collected in conjunction with fall electrofishing from 1990 – 2012. Only fishes ≤ 5 inches total length (TL) are considered as forage for the purpose of evaluating the available forage in the reservoir. Sunfish (*Lepomis spp.*), gizzard shad, (*Dorosoma cepedianum*), and threadfin shad (*Dorosoma petenense*) comprised the majority

of the species available as forage. The number per hour of black bass, sunfish and forage species are illustrated in Figure 13. The absence of black bass in the forage samples collected from 1990 – 1994 is likely due to bass not being included in the forage sample by persons conducting the samples.

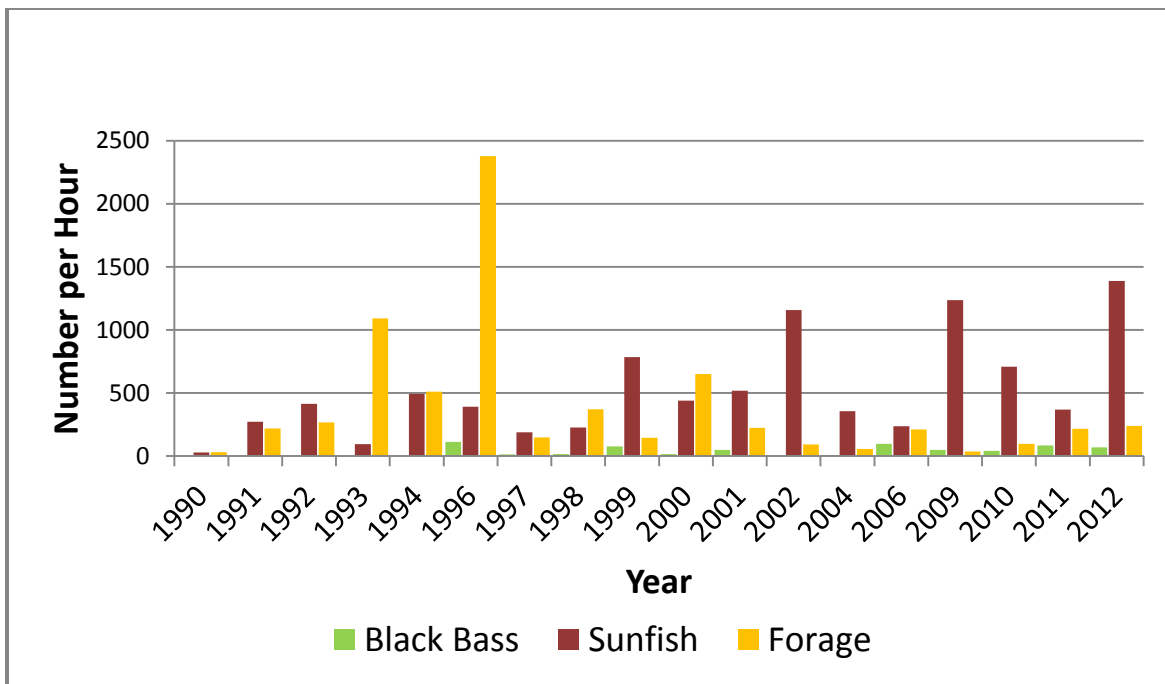


Figure 13. The CPUE in number per hour of fishes ≤ 5 inches TL from forage samples captured in Cross Lake, LA from 1990 to 2012.

The pounds per hour of species collected during the forage sample are shown in the graph in Figure 14. Sunfish (*Lepomis spp.*) comprised the largest component by weight of the available forage in the lake for all years except 1993.

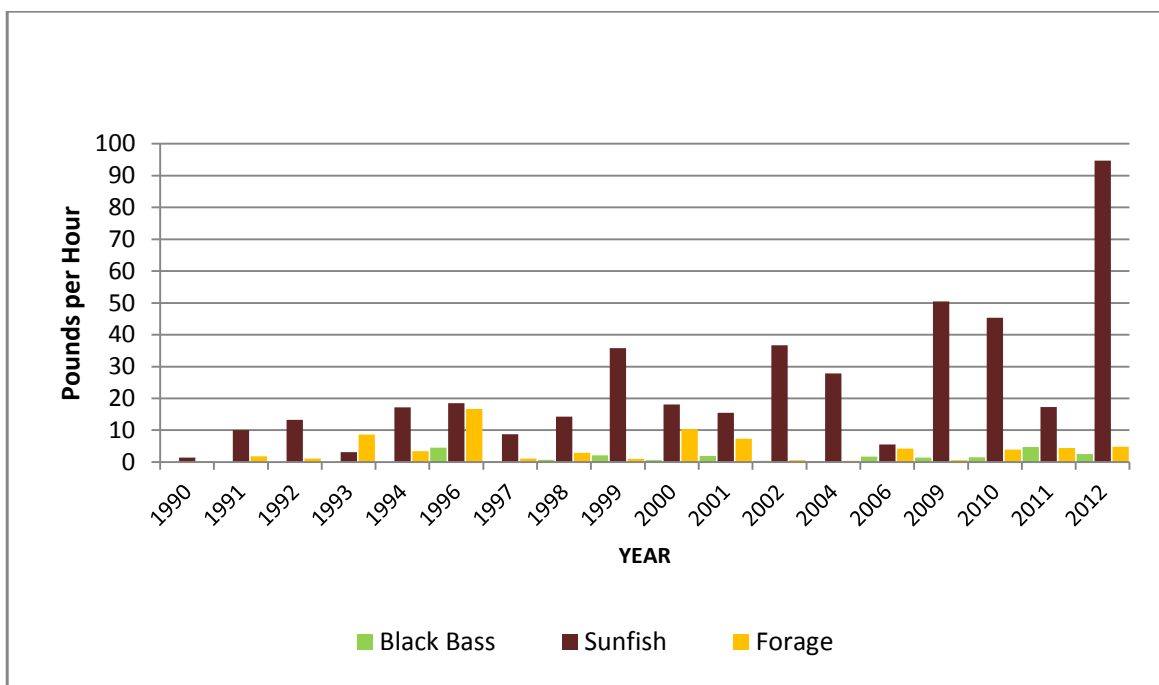


Figure 14. The CPUE in pounds per hour of fishes ≤ 5 inches TL from forage samples captured in Cross Lake, LA from 1990 to 2012.

Crappie

Crappie collected during biomass (rotenone) sampling conducted from 1967 to 1989 consisted of both black crappie (*Pomoxis nigromaculatus*) and white crappie (*Pomoxis annularis*). White crappies were found to be more abundant. The sampling revealed variations in abundance through the period sampled. The crappie population averaged a relatively low 3.6 pounds per acre per year (Figure 15).

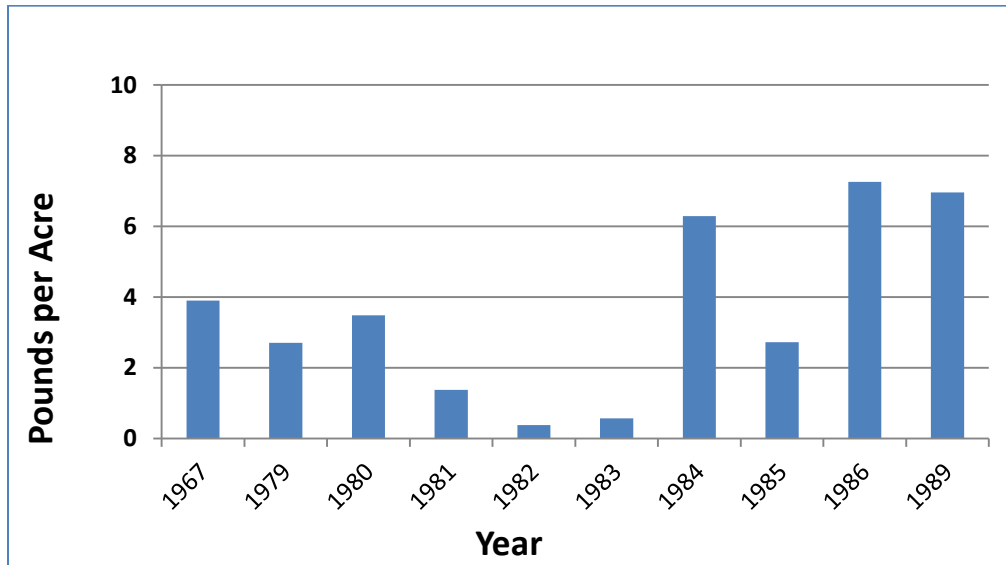


Figure 15. The CPUE in pounds per acre of crappie collected from Cross Lake, LA, during biomass (rotenone) sampling from 1967 to 1989.

Few crappie were collected during spring electrofishing samples from 1990 – 2012 as depicted in Figure 16. Overall numbers were low in most of the samples. No crappie were collected in several of the samples.

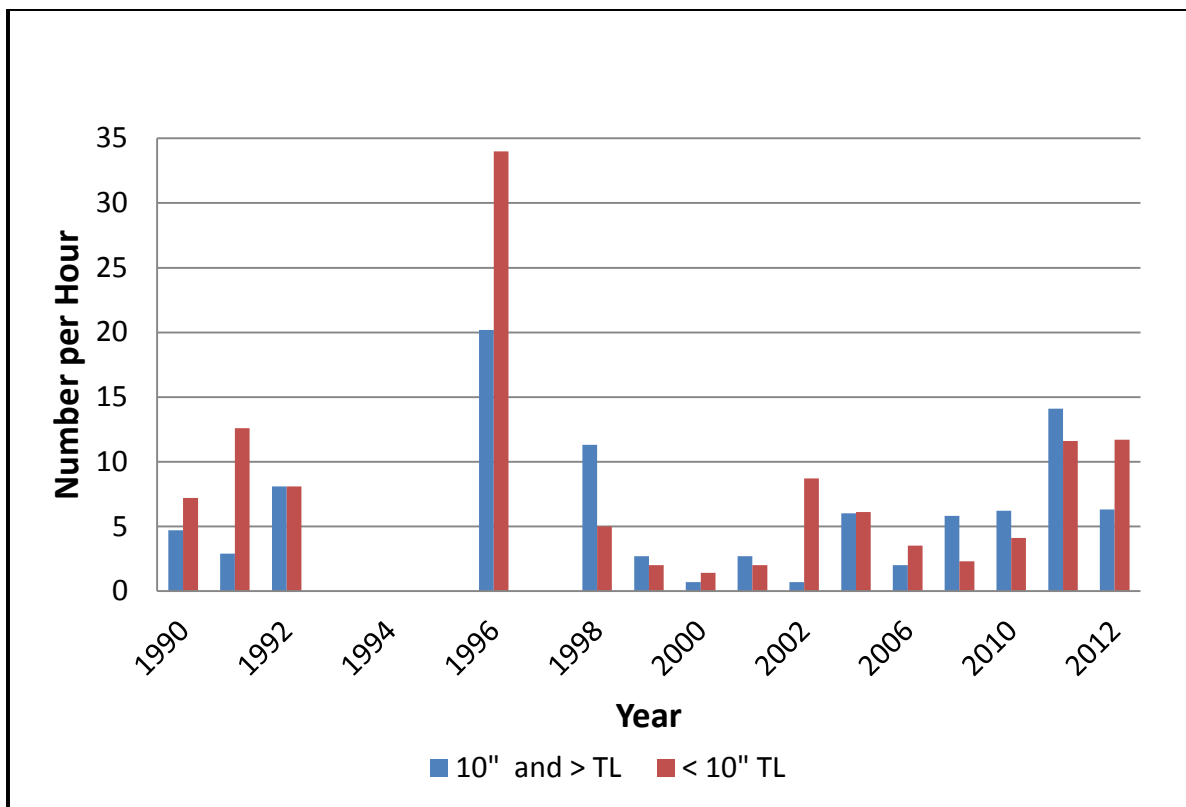


Figure 16. The CPUE of crappie from Cross Lake, LA captured during springtime electrofishing samples from 1990 to 2012. TL = total length.

Results from gill net sampling are indicated in Figure 17. Although overall numbers of crappie collected in gill nets are relatively low, sampling reveals that larger size crappies are present in Cross Lake.

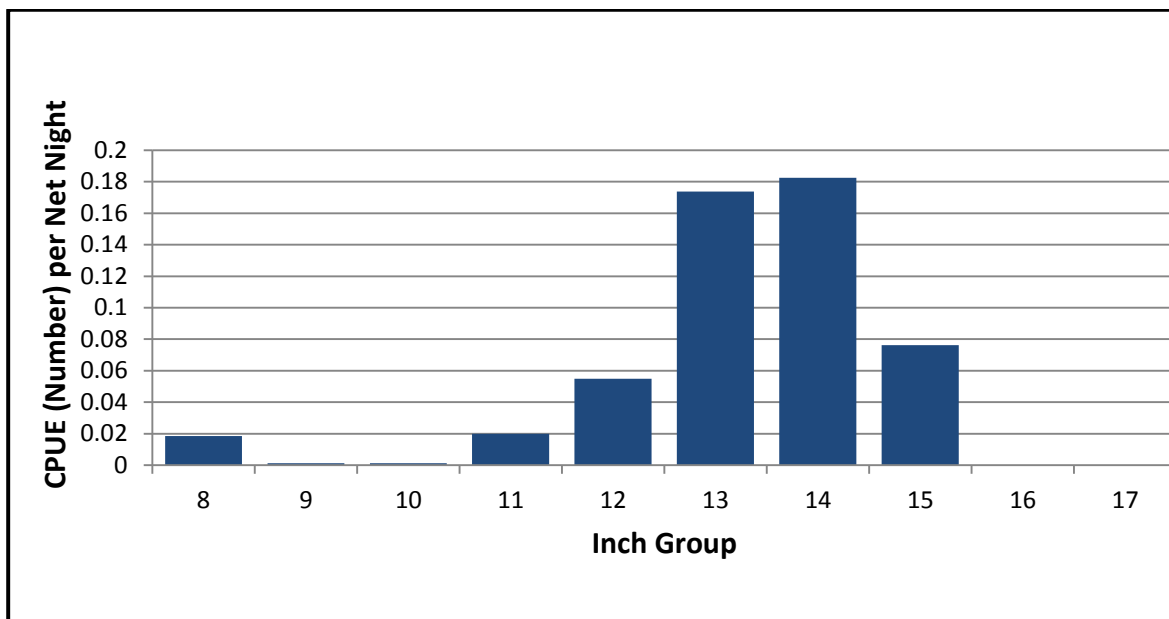


Figure 17. The Mean CPUE (number) per net night (per 100' net) of crappie collected during standardized gill net sampling on Cross Lake, LA from 1989 - 2013.

Lead net sampling was conducted on Cross Lake from 2010 – 2012 to collect information on crappie populations. Crappie otoliths were collected for age and growth studies. Analysis of data collected is not yet complete and mortality, age and growth results are not available at this time.

Inch group compositions of crappie taken by lead net sampling show some variation from year to year. The majority of the crappie collected from Cross Lake with lead nets ranged from 5 to 10 inches, with the six inch group being the most common size. The catch per hour values for each size group is given in Figure 18.

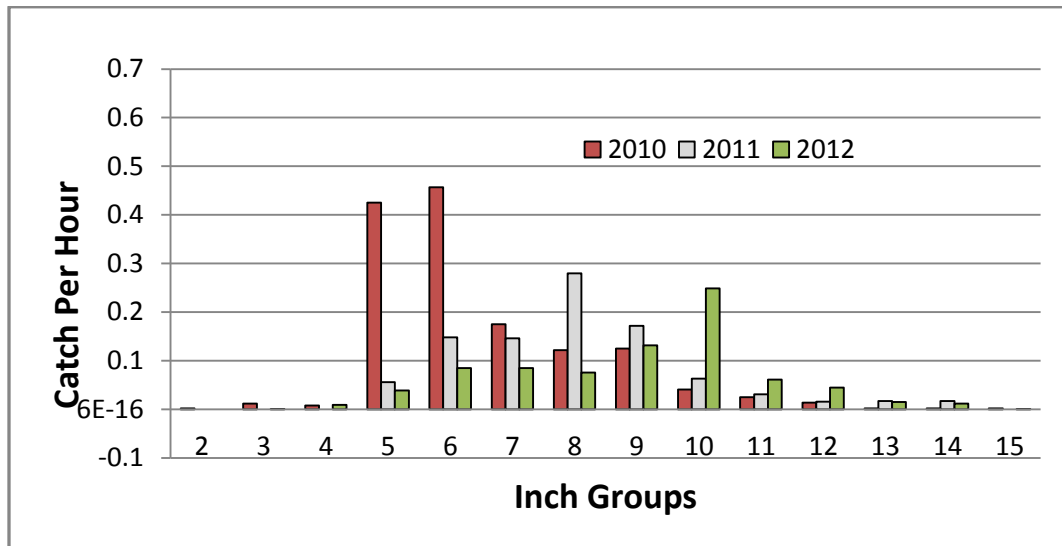


Figure 18. The CPUE by inch group for crappies collected at Cross Lake, LA by lead net sampling during 2010 – 2012.

Figure 19 depicts the relative abundance for crappies by catch per hour of selected size groups collected in lead nets. It appears that a strong year class of fish moved from stock size, to quality size, and preferred size from 2010-2012.

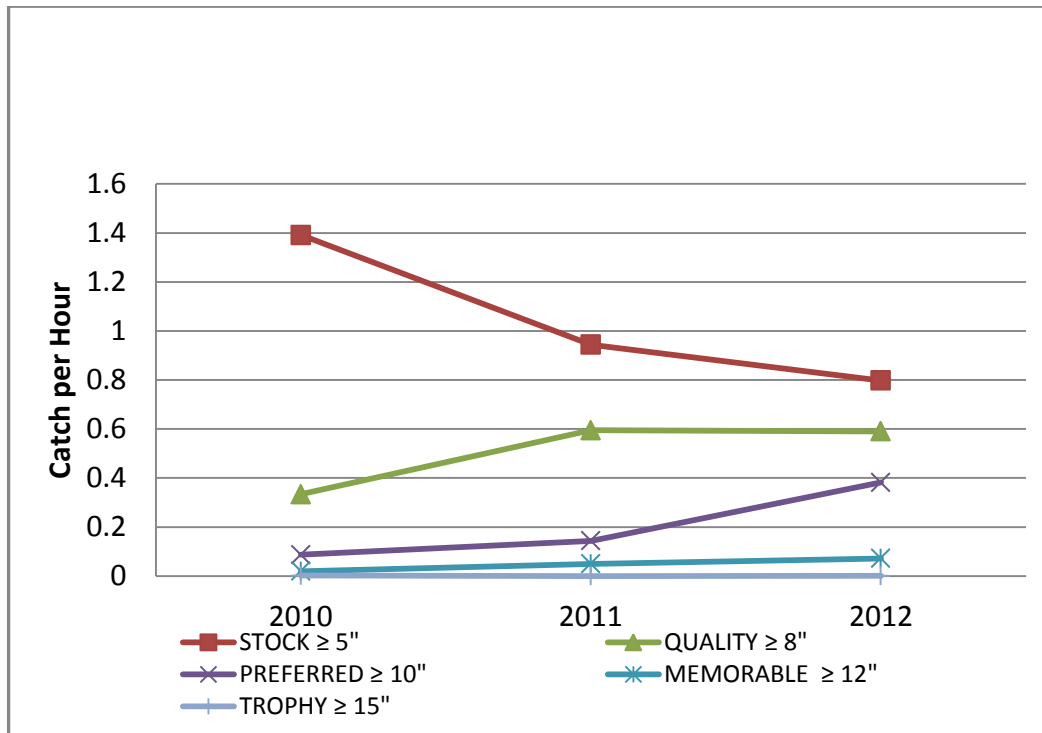


Figure 19. The CPUE (number per hour) of selected crappie size groups for Cross Lake, LA, by caught in lead net samples from 2010 – 2012.

Relative stock density (RSD) and proportional stock density (PSD) values for crappies are also derived from lead net sampling results. These stock density indices are illustrated in Figure 20. The indices reveal an increase in the proportion of fish 8 inches and longer collected in lead net samples over the period 2010 – 2012.

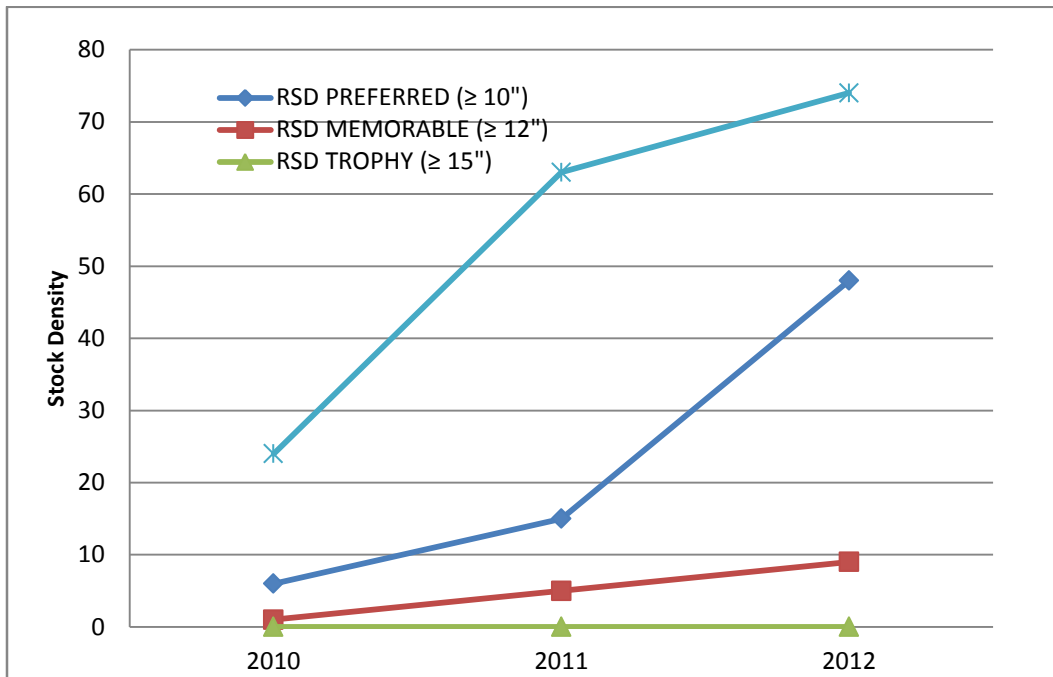


Figure 20. The proportional stock density (PSD) and relative stock density (RSD) for crappies caught in Cross Lake, LA, by lead net sampling 2010 – 2012.

Hybrid Striped Bass

Hybrid striped bass have been stocked in Cross Lake for a number of years as an additional sport fish and to provide a biological control measure for the excess gizzard shad population. These fish are not readily sampled with other gear types but comprise a significant portion of the recreational fish collected during gill net sampling as indicated in the graph in Figure 21.

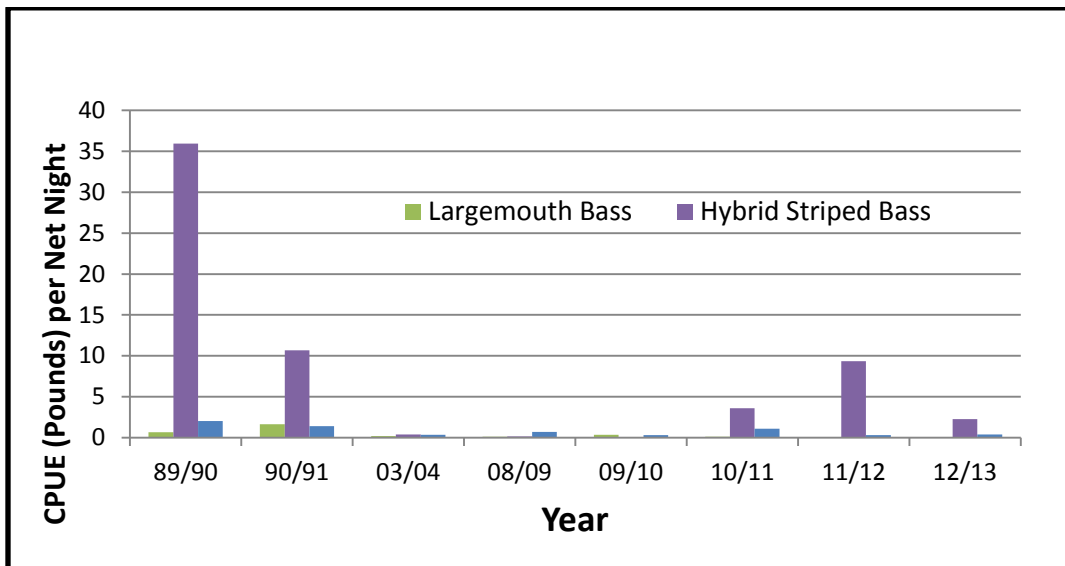


Figure 21. The catch per unit effort (CPUE) in pounds per net night (100' net) of largemouth bass, hybrid striped bass, and crappie in Cross Lake, LA, from standardized gill net results for 1989 – 2013.

The hybrid striped bass affords anglers a larger size sport fish which is well adapted to the open water areas of Cross Lake (Figure 22). More anglers appear to be pursuing hybrid striped bass on Cross Lake in recent years following the latest stockings. It is still

a relatively small group of anglers, accounting for just 1% of angling efforts during the 2010 creel survey. The variation in Figure 22 may be explained by the inconsistent stockings of hybrid striped bass into the reservoir.

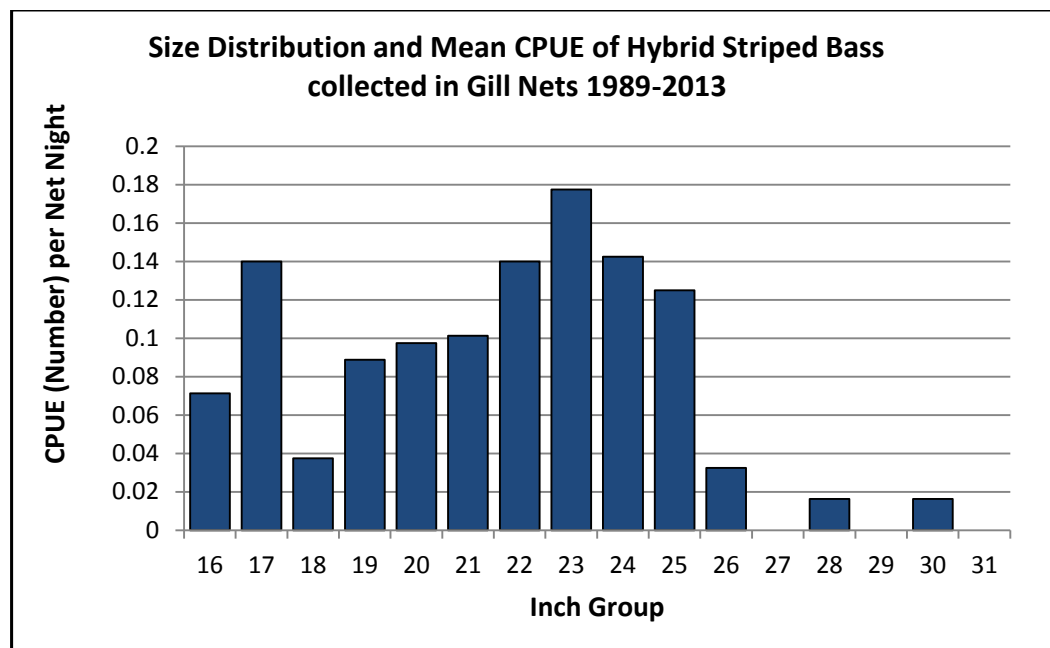


Figure 22. The mean CPUE (number of fish) per net night (100' net) per size group for hybrid striped bass collected during standardized gill net sampling on Cross Lake, LA from 1989 - 2013. N = 351.

Commercial

Cross Lake supports an abundant catfish population, readily available to recreational fishermen. Recreational fishing for catfish accounted for 17.1% of the total angling effort during the 2010 creel survey. Commercial fishing is only allowable by contract with the City of Shreveport as per a city ordinance. The use of gill nets, trammels nets, hoop nets and fish seines was prohibited in Cross Lake in September 1986 by the Louisiana Wildlife and Fisheries Commission.

Biomass sampling-

Historical biomass sampling on Cross Lake indicates that channel catfish (*Ictalurus punctatus*), and freshwater drum (*Aplodinotus grunniens*) were present in significant numbers in the lake. (Figure 23).

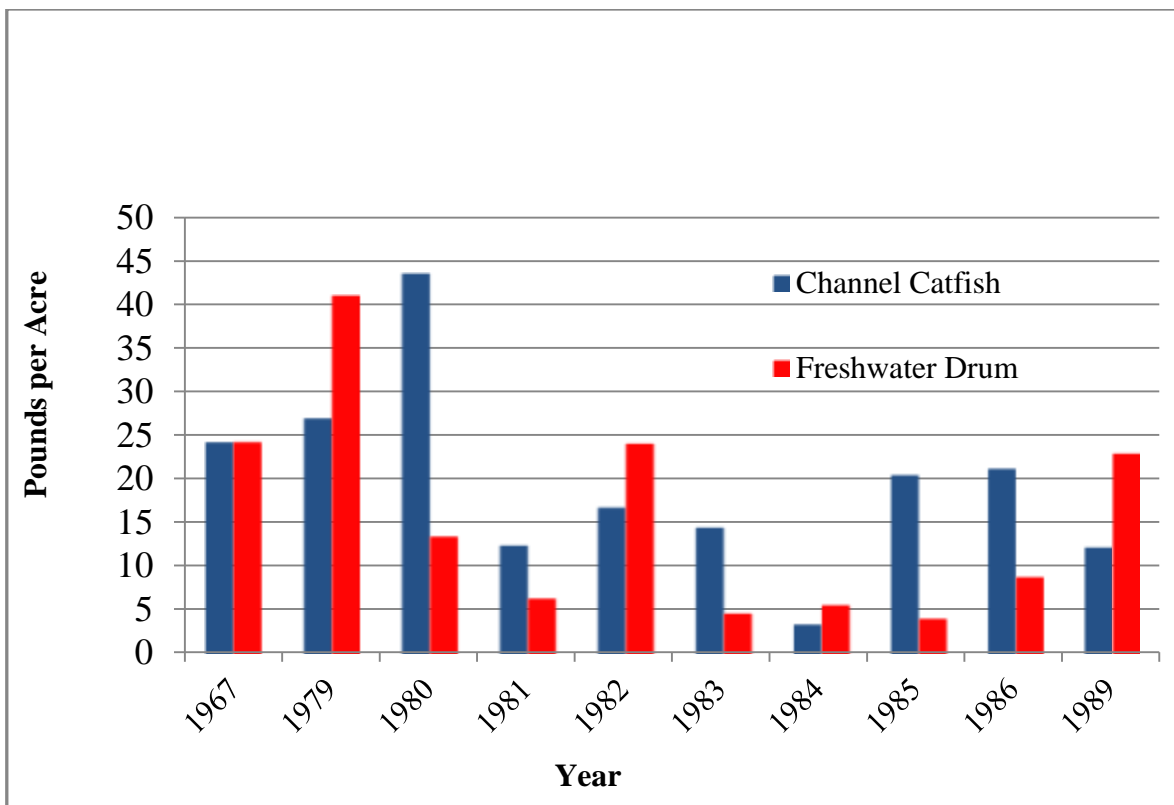


Figure 23. The CPUE in pounds per acre of commercial fish collected during standardized biomass (rotenone) sampling in Cross Lake, LA, from 1967 to 1989.

Gill nets-

Standardized sampling with gill nets was conducted on the lake from 1989 – 2013. The primary commercial species collected were catfish as indicated in Figure 24.

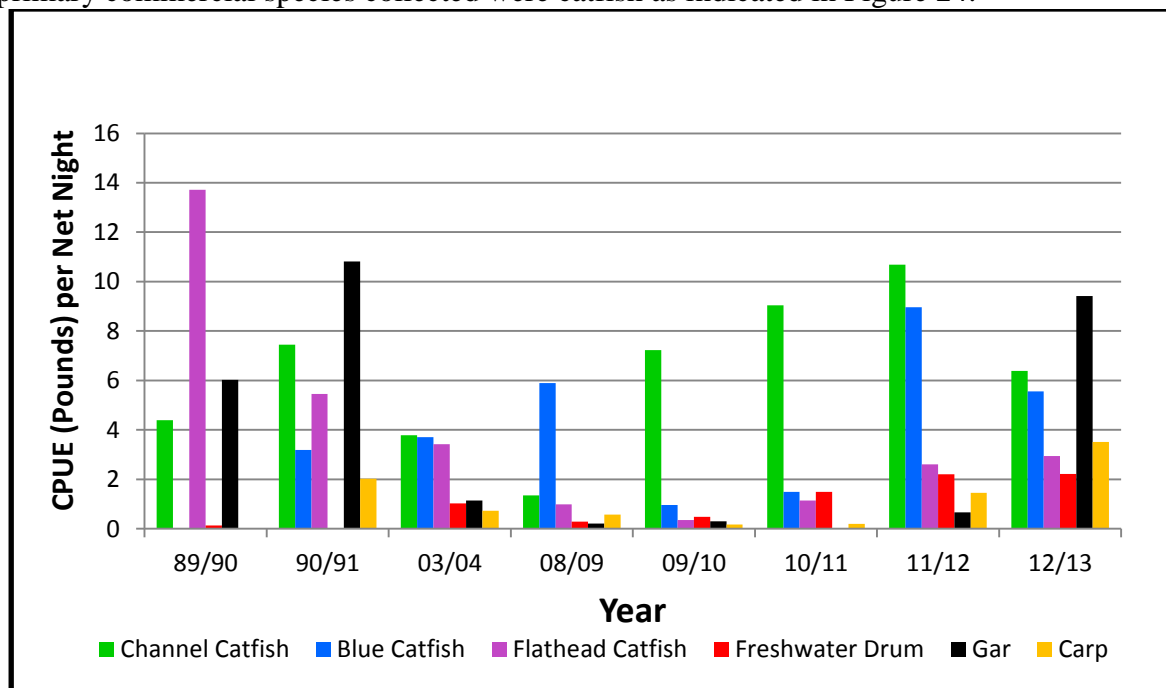


Figure 24. The CPUE in pounds per net night (100' net) per year of commercial fish in Cross Lake, LA, during standardized gill net sampling from 1989 – 2013.

HABITAT EVALUATION

Aquatic Vegetation

Nuisance aquatic vegetation has been present in Cross Lake for many years. Although Cross Lake is a relatively shallow reservoir, only the west end and the upper reaches of the coves possess cypress trees. Much of the lake is open and subject to abundant wave action. This wave action helps to reduce both floating and rooted submerged aquatic vegetation in the main body of the reservoir. Additionally, proactive management by city officials has been instrumental in protecting the water supply for the City of Shreveport. In most cases vegetation problems have been managed through herbicide applications by city employees/contractors so that recreational boating and fishing access have not been seriously impacted.

Control efforts by city officials for hydrilla (*Hydrilla verticillata*) on Cross Lake have been ongoing since 1998. Those efforts include a combination of herbicide applications and biological control utilizing triploid grass carp. To date, hydrilla has been kept at manageable levels. The water supply is not imminently threatened and recreational activities have not been seriously impacted.

Giant salvinia (*Salvinia molesta*) was first documented in Cross Lake in 2006. City officials have requested assistance from LDWF on two occasions. In 2009, LDWF spray crews treated 350 acres of vegetation consisting primarily of giant salvinia on Cross Lake. A survey conducted in October 2009 by LDWF indicated that 1402 acres were covered by giant salvinia. This survey was conducted just prior to a major flood event and subsequent freeze event the following winter. After those two events, giant salvinia coverage decreased markedly. In the following years, coverage of the plants expanded. Prior to LDWF providing contract applicators to assist on Cross Lake, a survey was conducted in June 2013 showing giant salvinia coverage at 1,842 acres. During 2013, LDWF contract sprayers treated 1,052 acres of giant salvinia.

Substrate

The substrate of Cross Lake is composed of poorly drained soils in the valleys of Cross Bayou and Paw Paw Bayou. Cross Lake is typical of many impounded natural cypress swamps in that eutrophication has been accelerated by the altered hydrological regime. Aquatic vegetation and leaf litter from the dense forest canopy on the upper end of the lake contribute to a buildup of organic matter on the lake bed. This organic muck degrades fisheries habitat. In a natural cypress swamp, periods of low water in the late summer and early fall facilitate decomposition of organic matter through aerobic decomposition. Without the natural water fluctuation, leaf litter and dead aquatic vegetation are subject to the much slower anaerobic decomposition. The slow anaerobic decomposition process of leaf litter in Cross Lake is responsible for accretion of organic material and an associated decline in habitat conditions and fish productivity in the heavily forested areas of the lake. Drawdowns have been used successfully on other lakes to slow the eutrophication process, but drawdowns are not used as a management strategy for Cross Lake. Cross Lake serves as the water supply for the City of Shreveport.

Water Level

Presently, Cross Lake water levels are maintained close to pool stage by pumping water from nearby 12-mile Bayou into the lake. Prior to this project going on-line in 1957, water levels

in the lake would drop during the summer. The drop in water level coincided with increased municipal water use, increased evaporation rates, and decreased precipitation. These water fluctuations mimicked a small mid-summer drawdown on the reservoir and more closely resembled the natural water fluctuations present in a swamp habitat. These events helped reduce the organic accretion in the lake. As the population of Shreveport increased, there was concern over allowing the lake to drop so low each year and the pump was installed. Water levels are now maintained near pool unless there is a mechanical failure. The project was altered again in 1994 when the J. Bennett Johnston Waterway was completed on the Red River which raised and stabilized water levels at the pumping site in 12 Mile Bayou. Since 1995, pumping has increased to approximately 200 days per year on average. This increase in pumping has brought in nutrient-rich river water which likely helps the lake maintain its beneficial phytoplankton bloom year round.

Complex Cover

Complex cover in Cross Lake consists primarily of cypress forests on the upper end of the lake and in the back of the coves. The majority of the shoreline of the lake is lined with scattered cypress trees, piers and boathouses. Submerged aquatic vegetation in Cross Lake is mostly on the upper end of the lake and in the of coves. Cross Lake is estimated to have 4,946 acres of littoral habitat for black bass. This area includes water out to the 8 foot contour.

CONDITION IMBALANCE / PROBLEM

The most significant problem on Cross Lake is the presence of invasive aquatic vegetation, including giant salvinia and hydrilla. These plants pose a formidable threat to the aquatic habitat and recreational activities. The plants also are a serious potential hindrance to the pumping of water for the City of Shreveport.

Cross Lake supports a healthy largemouth bass population, however there is currently a 14" – 17" protective slot limit which has been found to have minimal impact on the population due to reluctance of anglers to harvest largemouth bass.

The eutrophication process in Cross Lake is detrimental to fisheries habitats, storage volume and water quality for the reservoir which serves as the water supply for the City of Shreveport. The inability to utilize drawdowns to slow this process due to concerns over water storage volume leaves reservoir managers no practical solution to the problem.

CORRECTIVE ACTION NEEDED

Control invasive aquatic vegetation.

Remove the 14" – 17" protective slot limit for black bass.

RECOMMENDATIONS

1. Provide technical advice and assistance to officials with the City of Shreveport for vegetation control efforts on Cross Lake when requested. LDWF has a standing offer to provide herbicide applications for giant salvinia on Cross Lake if requested by city officials. Giant salvinia will be controlled with a mix of glyphosate (0.75 gal/acre) and diquat (0.25 gal/acre) with Aqua King Plus (0.25 gal/acre) and Thoroughbred (8 oz/acre) surfactants from April 1 to October 31. Outside of that time frame, diquat at a rate of 0.75 gallons per acre will be used in addition to 1 qt of surfactant mix being comprised of one part Thoroughbred and 3 parts Aqua King. City of Shreveport employees are working cooperatively with LSU Ag Center to stock and monitor salvinia weevil populations on the lake. Assistance will be provided with weevils as requested.
2. Remove the 14" – 17" protective slot limit on black bass and change the regulation to the statewide limit of 10 fish with no size restrictions. A notice of intent (NOI) was passed on January 9, 2014 by the Louisiana Wildlife and Fisheries Commission to take this action. Pending favorable public comment and legislative review, the change could become effective by April 30, 2014.
3. Continue to stock Florida largemouth bass fingerlings at the rate of 20 fish per acre of bass habitat to keep the Florida gene established in the population and allow anglers an opportunity to catch an occasional memorable or trophy-size bass.
4. Continue to stock hybrid striped bass fingerlings at the rate of 10 fish per surface acre to help control excess gizzard shad and allow anglers increased recreational opportunities.
5. Continue LDWF standardized electrofishing sampling on a biennial basis.